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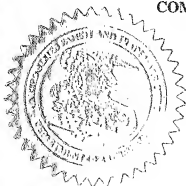
July 07, 2004

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APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A
FILING DATE.

APPLICATION NUMBER: 60/462,748

FILING DATE: April 13, 2003

RELATED PCT APPLICATION NUMBER: PCT/US04/11710

By Authority of the
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SEQ ID NO: 146 also contains an open reading frame comprising SEQ ID NO:

147. The invention includes a polypeptide comprising SEQ ID NO: 147. SEQ ID NO:

147 is set forth below.

SEQ ID NO: 147

MFIFLLFLTITSGSDLDRCCTTFDDVQAPNYTOHTSSMRGVVYPDEFSDTLTYLTQDQLFLP
FYSNVGTGFIHTNHTGPNVPFKDGIYFAATEKSNVVRGWVFGSTNNKKSQSVIHNSTN
VVIRACNFELCDNPFFAVSKPMGTQTHMIFDNAFNCTFEYISDAFSLDVSEKSGNFKHL
REFVFEKNKDGFLYVYKGYQPIDVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSPAQDI
WGTSAAYFVGYLKPITTFMLKYDENGITITDAVDCSQNPLAELKCSVKSFEDKGIYQTS
NFRVVPSSGDVVRFPNITNLCPFGEVFNATKFPVYAWERKKISNCVADYSVLVYNSTFFST
FKCYGVSAATKLNLCFSPNVYADSFVVKGDDVVRQIAPGQTGVIADYNYKLPDDFMGCVL
AWNTRNDATSTGNYNYKYR.YLRHGKLRPFERDISNVPTSPDGKPCITPPALNCYVPLND
YGFYTTTGIGYQPYRVVVLSEFLLNAPATVCGPKLSTDLKNCQVNFNFNGLTGTGVLT
SSKRFQPFQFGRDVSDFTDSVRDPKISEILDSPCAFGGVSVITPGTNASSEVAVLYQDV
NCTDVSTAIHADQLTPAWRIYSTGNNVFQTAQCLIGAEHVDTSYECDIPIGAGICASYH
TVSLLRSTSQKSIVAYTMSLGADSSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDCNM
YICGDSITECANLLQYGSFCTQLNRALSGIAAEQDRNTREVEAQVKQMYKPTLTKYFGFG
NFSQILPDPLKFKTKRSFIEDLLFNKVTLDAGFMKQYGECLGIDINARDLCAQKFNGLTVL
PPLLIDDMIAAYTAALVSGTATAGWTFGAGAAQIFFAMQMA.YRFNGIGVTONVLYEN
QKQIANQFNKAISQBSLTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVNDI
LSRLDKVEAEVQIDRLITGRLOSLQFYVTQQLIRAAEIRASANLAATKMSECVLQOSKRV
DFCGGYHLMSEFQAAPHGVVFLHVTYVPSQERNFTTAPACHEGKAYFPREGVEVFVNG
TSWETQRNFFSPQIITDNTFVSGNCDVVIGIINTVYDPLQPELDSFKEELDKWYKFNHTS
PVDVLGDISGINASVMNIQEKIDRLNEVAKNLNLSIDLQELGKYEQYIKWYVYVWLGFI
AGLIAVMVTILLCCMTSCCCKLGACSCGCKCFDEDDSEPVLKGVKLIHYT

The invention includes a polypeptide comprising an amino acid sequence having sequence identity to SEQ ID NO: 147. The invention includes a fragment of a polypeptide comprising SEQ ID NO: 147. The invention includes a diagnostic kit comprising a polypeptide comprising SEQ ID NO: 147, or a fragment thereof. The invention includes a diagnostic kit comprising a polynucleotide sequence encoding SEQ ID NO: 147, or a fragment thereof. The invention includes an immunogenic composition comprising a polypeptide comprising SEQ ID NO: 147, or a fragment thereof. The invention includes an antibody which recognizes a polypeptide comprising SEQ ID NO: 147, or a fragment thereof. SEQ ID NO: 147 demonstrates functional homology to a coronavirus spike protein.

The ORF1a and ORF1b sequences of coronaviruses are typically translated as a single ORF1ab polyprotein. Slippage of the ribosome during translation generates an a-1 frameshift. One region of such slippage is illustrated below: